Introduction to the International Symposium on the Health Effects of Boron and Its Compounds

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This issue of *Environmental Health Perspectives Supplements* includes papers presented at the International Symposium on Health Effects of Boron and Its Compounds, held September 16–17, 1992 at the University of California Irvine. Borates and boric acid, which through gross medical misuse years ago gained a reputation for acute poisonings and fatalities, have in recent years received growing attention from two separate, major groups of investigators. One group, under the leadership of Dr. Forrest H. Nielsen at the United States Department of Agriculture, Agricultural Research Center (USDA-ARS) Grand Forks Human Nutrition Research Center, has been pursuing evidence that boron is an essential element to humans, with a regulatory role in calcium metabolism and energy substrate use. The other group, under the leadership of Dr. Bernard A. Schwetz at the National Institute of Environmental Health Sciences (NIEHS) has been studying the reproductive and developmental toxicity of boron and the borates and has found boric acid at high doses to be a model compound for the study of mechanisms of reproductive and developmental toxicity.

As scientists concerned with risk analyses of environmental agents, driven by the results of reproductive studies, began to calculate safe boron exposures for the general public, it became apparent that risk estimates were encroaching upon the boron levels that were considered beneficial for human nutrition. As a result, Drs. Nielsen and Schwetz felt that there was a need for a forum in which researchers from around the world studying boron's health effects could share their findings and concerns.

Additionally, since biologically effective levels of boron can be very low, and since boron is ubiquitous in the environment and present in most foods, analytical methods for accurate boron determination were considered to be central to all scientists doing research in the field. The leaders in the chemical analysis of boron present in biological matrices generously accepted an invitation to participate.

The papers in this symposium refer at times to boric acid, at times to borax, and at times to boron. Studies in animals of the effects of boric acid and borax show that effects occur at very similar doses when they are converted to boron equivalents. Thus, occasionally, authors will interchange the test substance with boron equivalents. Values for deriving these equivalents are: weight of boric acid (H_3BO_3) × 0.1748 = equivalent boron; weight of borax ($Na_2B_4O_7 \cdot 10H_2O$) × 0.1134 = equivalent weight boron.

This conference, as may be apparent in the proceedings that follow, achieved its purpose of stimulating interaction among investigators conducting boron-related research and bringing into focus the convergence of research being conducted at the two extremes of the exposure spectrum. The conference proceedings were concluded by the joint chairmen, with a summary written by Ernest Mastramatteo and useful suggestions for future research by Frank Sullivan.